

WHAT IS CLAIMED IS:

1 1. Apparatus for printing a desired image on a printing  
2 medium, based upon input image data, by construction from  
3 individual marks formed in a pixel grid; said apparatus  
4 comprising:  
5 at least one multielement incremental-printing array  
6 that is subject to colorant-deposition error;  
7 means for measuring such colorant-deposition error of  
8 the at least one array;  
9 means for modifying a multicolumn, multirow numerical  
10 tabulation that forms a mapping between such input image  
11 data and such marks, to compensate for the measured col-  
12 orant-deposition error; and  
13 means for printing using the modified mapping.

1 2. The apparatus of claim 1, wherein the mapping is  
2 selected from the group consisting of:  
3 an optical-density transformation of the image data  
4 to such construction from individual marks; and  
5 a spatial-resolution relationship between the image  
6 data and such pixel grid.

1 3. The apparatus of claim 2, wherein:  
2 the optical-density transformation comprises a half-  
3 toning matrix; and  
4 the spatial-resolution relationship comprises a scal-  
5 ing of the image data to such pixel grid.

1      4.    The apparatus of claim 1, wherein:

2        said at least one multielement incremental-printing  
3        array comprises a plurality of multielement printing  
4        arrays that print in a corresponding plurality of differ-  
5        ent colors or color dilutions, each multielement printing  
6        array being subject to a respective colorant-deposition  
7        error; and

8           the measuring means and the mapping-modifying means  
9       each operate with respect to each one of the plurality of  
10      multielement printing arrays respectively.

1     5.     The apparatus of claim 4, wherein:

2           for at least one of the plurality of multielement  
3     printing arrays, the colorant-deposition error comprises a  
4     respective pattern of printing-density defects; and where-  
5     in:

6           the measuring means comprise means for measuring the  
7    pattern of printing-density defects for each multielement  
8    printing array respectively; and

9           the modifying means comprising means for applying the  
10       respective pattern of defects, for at least one of the  
11       multielement printing arrays, to modify a respective said  
12       mapping.

1     6.    The apparatus of claim 4, wherein:  
2           for at least one of the plurality of multielement  
3     printing arrays, the colorant-deposition error comprises a  
4     swath-height error;  
5           the measuring means comprise means for measuring the  
6     swath-height error for each multielement printing array  
7     respectively; and  
8           the modifying means comprise means for applying the  
9     respective swath-height error, for at least one of the  
10    multielement printing arrays, to modify a respective said  
11    mapping.

1     7.    The apparatus of claim 1, wherein:  
2           the colorant-deposition error comprises a pattern of  
3     printing-density defects;  
4           the measuring means comprise means for measuring the  
5     pattern of printing-density defects;  
6           the modifying means comprise:  
7  
8                 means for deriving a correction pattern from  
9                 the measured pattern of printing-density  
10                defects, and  
11  
12               means for applying the correction pattern to  
13               modify a halftone thresholding process; and  
14  
15           the printing means comprise means for printing such  
16     image using the modified halftone thresholding process.

1     8. The apparatus of claim 1, wherein:

2           the colorant-deposition error comprises a swath-  
3 height error or otherwise corresponds to a optimum dis-  
4 tance of printing-medium advance;

5       the measuring means comprise means for measuring the  
6       swath-height error or determining the optimum distance;

7 the modifying means comprise:

8

9 means for deriving a correction pattern from the  
0 measured swath-height error or determined  
1 optimum distance, and

2

3 means for applying the correction pattern to  
4 modify a halftone thresholding process; and

5

the printing means comprise means for printing such  
image using the modified halftone thresholding process.

9. A method of printing a desired image, by construction from individual marks formed in a pixel grid by at least one multielement printing array that is subject to a pattern of printing-density defects; said method comprising the steps of:

6 measuring such pattern of printing-density defects;

7        deriving a correction pattern from the measured pat-  
8        tern of printing-density defects;

9       applying the correction pattern to modify a halftone  
0       thresholding process; and

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1      printing such image using the modified halftone
2      thresholding process.
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1     10. The method of claim 9, for use with a printmask in  
2     plural-pass printing, and further comprising the steps of,  
3     before or as a part of the applying step:

4       using such printmask to determine a relationship be-  
5       tween the halftone matrix and the multielement array; and  
6       employing the relationship in the applying step to  
7       control application of the correction pattern to the half-  
8       tone matrix.

1 11. The method of claim 9, wherein:

2 the printing step comprises single-pass printing.

1 12. The method of claim 9, for use with said at least one  
2 multielement incremental-printing array that comprises a  
3 plurality of scanning multielement printing arrays that  
4 print in a corresponding plurality of different colors or  
5 color dilutions, each multielement printing array being  
6 subject to a respective swath-height error; and wherein:  
7 the measuring, deriving, applying and printing steps  
8 are employed to modify swath height of at least one of the  
9 scanning multielement printing arrays, for accommodating  
10 any swath-height error present in each multielement print-  
11 ing array respectively.

1 13. The method of claim 9, for use with said at least one  
 2 multielement incremental-printing array that comprises a  
 3 plurality of multielement printing arrays that print in a  
 4 corresponding plurality of different colors or color dilu-  
 5 tions, each multielement printing array being subject to a  
 6 respective pattern of printing-density defects; and where-  
 7 in:

8 the measuring, deriving, applying and printing steps  
 9 are each performed with respect to each multielement  
 10 printing array respectively.

1 14. The method of claim 13, for use with such plurality  
 2 of multielement incremental-printing arrays that are also  
 3 each subject to a respective swath-height error; and  
 4 wherein:

5 the measuring, deriving, applying and printing steps  
 6 are also employed to modify swath height of at least one  
 7 of the multielement printing arrays, for accommodating any  
 8 swath-height error present in each multielement printing  
 9 array respectively.

1 15. The method of claim 9, wherein:

2 the halftone thresholding process comprises defini-  
 3 tion of a halftone matrix.

1 16. The method of claim 9, wherein:

2 the halftone thresholding process comprises an error-  
 3 diffusion protocol.









1 30. The method of claim 25, for use with said at least  
2 one scanning multielement printing array that comprises a  
3 plurality of multielement printing arrays that print in a  
4 corresponding plurality of different colors or color dilu-  
5 tions, each multielement printing array being subject to a  
6 respective swath-height error; wherein:

7 the measuring, scaling and printing steps are each  
8 performed with respect to each multielement printing array  
9 respectively.

1 31. The method of claim 30, wherein the printing step  
2 comprises:

3 comparing optimum advance values or swath-height  
4 values measured for the plurality of multielement printing  
5 arrays respectively, to find the smallest of said values;

6 selecting a particular multielement printing array  
7 whose said value is substantially the smallest;

8 using, in common for the plurality of printing ar-  
9 rays, substantially said selected smallest value; and

10 for substantially each array other than the particu-  
11 lar array, operating with a respective reduced number of  
12 printing elements and with rescaled data, to match an ac-  
13 tual effective swath height of the particular array.

1 32. The method of claim 31, wherein:

2 said smallest of said values is determined taking in-  
3 to account the maximum available number of printing ele-  
4 ments in the corresponding array.

